Towards molecular imaging for personalized therapy of patients with colorectal cancer liver metastasis

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Summary

Approximately half of the patients suffering from cancer in colon or rectum dies as a consequence of dissemination to other organs, which often occurs to the liver. Only 36-58% of the patients treated with resective surgery of the colorectal cancer liver metastases (CRCLM) survives longer than five years after resection. Biological markers with added prognostic value to the standard clinical prognostic parameters may be visualized using molecular imaging techniques, such as positron emission tomography (PET). We focused on the identification of proteins that could be used as prognostic biological markers and for one of these we developed a novel tracer for PET imaging.

In tissue samples of 507 patients with CRCLM, we identified SLC2A1, VEGFA, EGFR, PTGS2 and AURKA as strong and independent prognostic biological markers. Furthermore, we demonstrated that the combination of AURKA, PTGS2 and MMP9 was superior to the standard clinical prognostic parameters in predicting survival. Considering the prognostic value of AURKA, we labeled a specific AURKA inhibitor, i.e. alisertib, with radio-isotopes and demonstrated that this PET tracer was capable of visualizing high AURKA levels in preclinical models.

This research provides another small step towards obtaining a complete overview of CRCLM biology. It is our vision that personalization of cancer treatment based on the biological profile of the CRCLM, in combination with the clinical profile, will improve survival of patients with CRCLM.